CLAIMS

What is claimed is:

1. An integrated circuit comprising a first layer bearing first metallization patterned for defining a first inductive coil, a second layer bearing second metallization patterned for defining a second inductive coil that overlies the first inductive coil and that is magnetically coupled to the first inductive coil through a third layer interposed between the first layer and the second layer, said third layer bearing third metallization for defining an electric shield, the third metallization being patterned into a plurality of structures having shapes intended to minimize eddy currents and being connected to further metallization that carries a ground potential.

2. An integrated circuit as in claim 1, where said third layer further bears other metallization for coupling together at least two components of said integrated circuit.

3. An integrated circuit as in claim 1, where said electric shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of a frequency of an electrical signal that is applied to said first inductive coil.

4. An integrated circuit as in claim 1, where said electric shield is patterned to form a plurality of ribbon structures, each ribbon being spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and said second metallization.

5. An integrated circuit as in claim 1, where said electric shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of a frequency of an electrical signal that is applied to said first inductive coil and each ribbon being spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and said second metallization.

6. An integrated circuit as in claim 1, where said electric shield is patterned to form a plurality of groups of ribbon structures, within each group the ribbon structures being

electrically connected together at one point, and each group being electrically connected together at one point for being connected to the further metallization that carries the ground potential.

7. An integrated circuit as in claim 6, where each group of ribbon structures is electrically connected together at a point located at about a center of the patterning of the first and second metallizations.

8. An integrated circuit as in claim 1, further comprising a fourth layer interposed between the first layer and the second layer, said fourth layer bearing fourth metallization for defining a second electric shield, the fourth metallization also being patterned into a plurality of structures having shapes intended to minimize eddy currents and being connected to still further metallization that carries a ground potential.

9. An integrated circuit as in claim 8, where the further metallization that carries the ground potential carries a ground potential associated with said first inductive coil, and where the still further metallization that carries the ground potential carries a ground potential associated with said second inductive coil.

10. An integrated circuit as in claim 1, where the third metal is a non-ferrous metal.

11. A radio frequency integrated circuit (RFIC) comprising a first layer bearing first metallization patterned for defining a primary coil of at least one transformer, a second layer bearing second metallization patterned for defining a secondary coil of the at least one transformer, one of the primary or the secondary coil overlying the other one of the secondary or primary coil and being magnetically coupled thereto through a third layer interposed between the first layer and the second layer, said third layer bearing third metallization for defining an electrostatic shield for the at least one transformer, the third metallization being patterned into a plurality of structures having shapes intended to minimize eddy currents and being connected to further metallization that carries a ground potential, where said third layer further bears other metallization for coupling together at least two components of said RFIC.

12. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of the RF frequency of an electrical signal that is applied to said primary coil.

13. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of a skin depth in the third metallization of an RF frequency of an electrical signal that is applied to said primary coil.

14. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon being spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and said second metallization.

15. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of the RF frequency of an electrical signal that is applied to said primary coil and each ribbon being spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and said second metallization.

16. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of a skin depth in the third metallization of an RF frequency of an electrical signal that is applied to said primary coil and each ribbon being spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and said second metallization.

17. An RFIC as in claim 11, where said electrostatic shield is patterned to form a plurality of groups of ribbon structures, within each group the ribbon structures being electrically connected together at one point, and each group being electrically connected together at one point for being connected to the further metallization that carries the ground potential.

18. An RFIC as in claim 17, where each group of ribbon structures is electrically connected together at a point located at about a center of the patterning of the first and second metallizations.

19. An RFIC as in claim 11, further comprising a fourth layer interposed between the first layer and the second layer, said fourth layer bearing fourth metallization for defining a second electrostatic shield, the fourth metallization also being patterned into a plurality of structures having shapes intended to minimize eddy currents and being connected to still further metallization that carries a ground potential.

20. An RFIC as in claim 19, where the further metallization that carries the ground potential carries a ground potential associated with said primary coil, and where the still further metallization that carries the ground potential carries a ground potential associated with said secondary coil.

21. An RFIC as in claim 11, where the third metal is a non-ferrous metal.

22. An RFIC as in claim 11, where the RFIC is constructed using a CMOS process.

23. A method to construct a planar transformer in an integrated circuit, comprising:

fabricating a first layer bearing first metallization patterned for defining a first inductive coil;

fabricating a second layer over the first layer, the second layer bearing second metallization for defining an electric shield, the second metallization being patterned into a plurality of structures having shapes intended to minimize eddy currents, where fabricating the second layer comprises fabricating an electrical connection for coupling the electric shield to a ground potential; and

fabricating a third layer over the second layer, the third layer bearing third metallization patterned for defining a second inductive coil that overlies the first inductive coil and that is magnetically coupled to the first inductive coil through the electric shield.

24. A method as in claim 23, where fabricating the second layer further comprises providing additional metallization associated with other circuitry.

25. A method as in claim 23, where fabricating the second layer comprises fabricating a fourth layer over the second layer, and where fabricating the third layer fabricates the third layer over the fourth layer, the fourth layer bearing fourth metallization for defining a second electric shield, the fourth metallization also being patterned into a plurality of structures having shapes intended to minimize eddy current, where fabricating the fourth layer comprises fabricating a second electrical connection for coupling the second electric shield to ground potential.

26. A method as in claim 25, where the electrical connection couples the electric shield to a ground potential associated with one of the first inductive coil or the second inductive coil, and where the second electrical connection couples the second electric shield to a ground potential associated with the other one of the first inductive coil or the second inductive coil.

27. A method as in claim 23 where the fabricating steps are carried out in accordance with a CMOS process, and where the integrated circuit contains radio frequency (RF) circuitry.

28. A method as in claim 27, where the electrostatic shield is patterned to form a plurality of ribbon structures, each ribbon having a width that is a function of a skin depth in the second metallization of a radio frequency of an electrical signal that is applied to said primary coil.

29. A method as in claim 28, where each ribbon is spaced apart from an adjacent ribbon by a distance that is a function of a distance between said first metallization and third second metallization.

30. A method as in claim 23, where the second metal is a non-ferrous metal.

31. A radio frequency integrated circuit (RFIC) comprising a first layer bearing first electrically conductive material patterned for defining a primary coil of at least one transformer, a second layer bearing second electrically conductive material patterned for defining a secondary coil of the at least one transformer, one of the primary or the secondary coil overlying the other one of the secondary or primary coil and being magnetically coupled thereto through a third layer interposed between the first layer and the second layer, said third layer bearing third electrically conductive material for defining at least one electric shield for the at least one transformer, the third electrically conductive material being patterned into a plurality of structures having shapes intended to minimize eddy currents and being connected to further electrically conductive material that carries a ground potential.

32. An RFIC as in claim 31, where at least some of said electrically conductive material is comprised of metal.

33. An RFIC as in claim 31, where at least some of said electrically conductive material is comprised of a non-metal.

34. An RFIC as in claim 31, where said transformer is a balanced transformer, and where said at least one electric shield functions to improve the symmetry of the balanced transformer.

35. An RFIC as in claim 31, where said RFIC comprises a plurality of transformers, and where said third layer bears the third electrically conductive material for defining, for each of said plurality of transformers, at least one electric shield.

36. An RFIC as in claim 35, where said third layer further bears other electrically conductive material for coupling together at least two components of said RFIC.